Subpleural Pulmonary Hyalinizing Granuloma Presenting as a Solitary Pulmonary Nodule

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Abstract: We introduce a case of pulmonary hyalinizing granuloma presented as a solitary pulmonary nodule located subpleurally. The patient was a 57-year-old man who had abnormal chest roentgenograms showing a solitary pulmonary nodule in the right lower lung field. The nodule was resected for definitive diagnosis and histopathologically proved to be pulmonary hyalinizing granuloma. In previously reported cases, most patients had ill-defined margins and usually bilateral, multiple lesions radiographically. In our case, the subpleural location is an uncommon location of this rare entity.

Key Words: Pulmonary hyalinizing granuloma, Subpleural solitary pulmonary nodule.

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Pulmonary hyalinizing granuloma (PHG) is a rare disease usually present with bilateral multiple pulmonary nodules in chest radiograms and diagnosed by histological characteristic findings. Because of the absence of characteristic radiologic features, PHG is usually diagnosed by resection in the setting of suspicion of primary malignancy or metastasis. Since the first description by Engleman et al. in 1977,[1] fewer than 100 cases have been published, and most had multiple nodules or masses. We describe one case of subpleurally located PHG that was detected incidentally as a solitary well-defined pulmonary nodule.

CASE REPORT

A 57-year-old healthy man came to our hospital for routine health screening examinations. He had no specific medical history or family history such as cancer or cardiovascular diseases. He had no subjective symptoms or loss of weight. He never smoked, but he had been drinking alcohol moderately. He had been working in the construction industry as a director for the past 20 years. At the routine check, and unknown to him, arterial hypertension had been detected. A chest radiograph showed an abnormal mass shadow in the right lower lung field. Additional chest and abdominal computed tomography (CT) scans were performed. Abdominal CT findings were normal, but chest CT showed a right lower lung mass that was homogeneously enhancing, approximately 2.4 cm, well-demarcated, and adjacent to the diaphragm (Figure 1). Integrated positron emission tomography (PET)-CT showed a right lower lobe lung nodule of which maximal standard uptake value was 2.2 without involvement of another organ. Although the radiographic findings suggested that the nodule was a benign lesion, the lesion remained indeterminate. When given the option of biopsy, observation, or removal, the patient opted for removal. We therefore decided to perform video-assisted thoracoscopic resection of the nodule.

During the operation, the mass was seen as a solid movable tumor originating from the visceral pleura with a narrow stalk adherent to the diaphragmatic surface of the right lower lobe. It was well demarcated, a 3-cm, oval-shaped mass, and was not adhered to the diaphragm. There were no abnormalities in the lung parenchyma or mediastinum (Figure 1). Thoracoscopic wedge resection of the right lower lung was performed. Microscopically, it was not a visceral origin tumor but originated from the lung parenchyma, which was protruding subpleurally and was connected to the normal lung with the stalk. Histopathologic examinations showed bundles of lamellar hyalinized collagen fiber and focal aggregation of lymphocytes, which were compatible with pulmonary hyalinizing granuloma (Figure 2). Immunohistochemistry showed positive staining for cytokeratin (CK), thyroid transcription factor (TTF), and Congo red, whereas staining for S-100 proteins was negative. Tissue cultures for fungus and mycobacterium were negative.

The postoperative course was uneventful, and the patient was discharged on the fourth postoperative day. A follow-up CT scan 6 months later showed no recurrent or newly developed mass lesions.

DISCUSSION

Pulmonary hyalinizing granulomas (PHGs) are rare nodular lung lesions with characteristic pathologic features: dense network of concentric hyalinized collagen lamella surrounded by perivascular lymphoplasmacytic infiltrate. Since 1977, when it was first described by Engleman et al.,[1] fewer than 100 cases have been reported.

PHGs usually are present with bilateral well-demarcated pulmonary nodules on chest radiological studies with-

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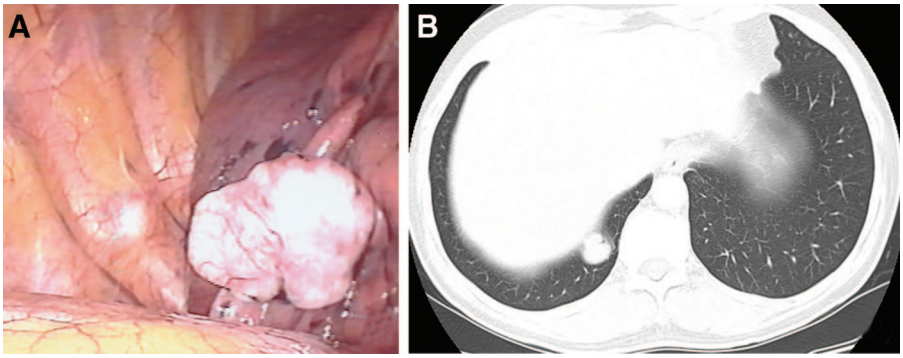

FIGURE 1. Thoracoscopic (*A*) and chest computed tomographic finding (*B*) of the mass. A whitish mass attached to the visceral pleural surface with pedicle was seen.

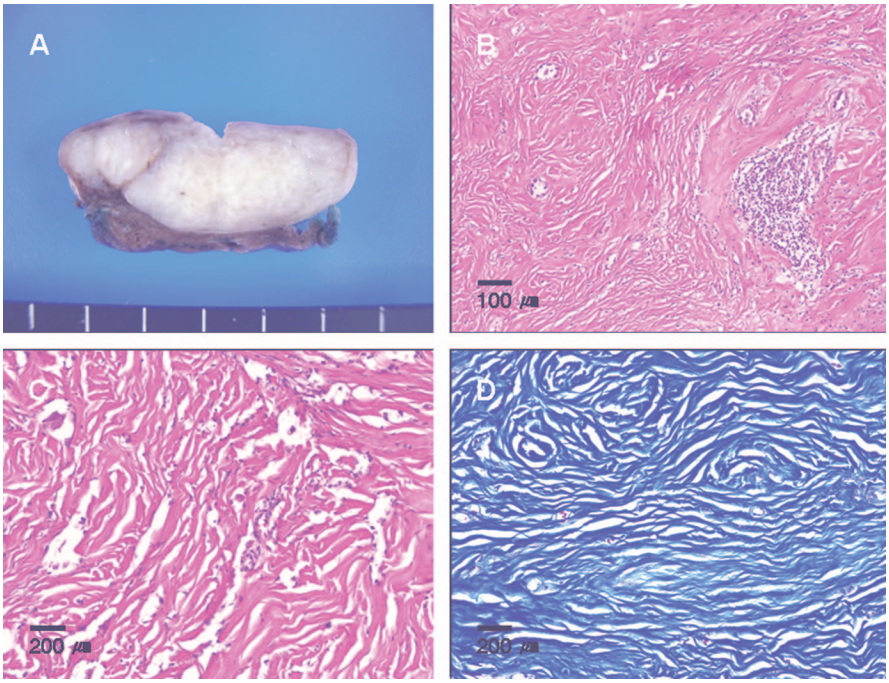

FIGURE 2. *A*, The cut surface reveals a white, firm, well-circumscribed nodule measuring 2.7 cm in the greatest diameter. Normal lung parenchyma is noted around the nodule. *B* and *C*, Microscopically, bundles of lamellar hyalinized collagen fibers and focal aggregation of lymphocytes are noted (hematoxylin and eosin staining). *D*, The bundles of lamellar hyalinized fibers stained blue on Masson trichrome staining (magnification ×200).

out specific symptoms. PHGs frequently occur in middle-aged adults with no gender predominance. Usually there are not associated symptoms, but there is sometimes vague chest discomfort or dyspnea. If a tumor is located adjacent to the mediastinum, the esophagus can be compressed, thus manifesting dysphagia. It has been suggested that when the nodules are located near the hilum or mediastinum, fibrosing mediastintitis may be prone to develop.[2] Extrapulmonary involvements are seen in approximately 20% of the reported cases.[3]

Clinically, PHGs are considered benign processes. The etiology of PHG is unknown, but it has been associated with immunologic or infectious diseases such as rheumatoid arthritis, sclerosing mediastinitis, retroperitoneal fibrosis, uveitis, oculopapillitis, tuberculosis, histoplasmosis, and aspergillosis. Exact associations between these diseases are not well understood, but it has been proposed that these conditions may present essentially the same reactive response of an immunologic mechanism.[2]

Neoplastic diseases such as lymphoma, multiple myeloma, Paget's disease, and brain astrocytoma have been reported to be associated with PHGs.[2,4,5]

Chest radiographs usually show bilateral multiple ill-defined homogenous nodules ranging in size from 2 to 15 cm, with or without cavitations or calcification. Presentation as a solitary nodule is rare.[6] The lesion can be situated in the lung parenchyma or subpleura.[3] Usually they grow slowly or do not grow at all, and spontaneous regression has been described.[7]

Diagnosis of PHGs requires histological examinations with appropriate specimens. Pathologically, these typically perivascular lesions are composed of homogeneous, pink, hyaline lamellae that are often surrounded by plasma cells, histiocytes, or lymphocytes. Lamellae are often parallel or storiform in formation.

Because of their behavior and to rule out other neoplastic diseases, a biopsy is essential to establish the primary diagnosis, and if adequate, a surgical resection is

the treatment of choice. Prognoses of PHGs are generally favorable. In one report using 19 patients' follow-up data,[8] 6 patients with solitary lesions were cured. However, six patients who had bilateral disease showed progressive enlargement.

In previously reported cases, most tumors had ill-defined margins, and if they were subpleurally located, they usually had multiple lesions.[3,9] Unique features of our case are a well-demarcated margin with normal lung tissue and presentation as a solitary nodule located subpleurally.

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